

# PATENT ABSTRACTS OF JAPAN

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## (54) TRANSPARENT PRINTING FORM

(57)Abstract:

PURPOSE: To provide a moldable and transparent printing form, by a method wherein, since the surface of a transparent plastic film is modified, set-off at the time of printing can be prevented without spoiling transparency, correspondence to various kinds of recording devices can be performed, at the same time a transparent printing form and base superior in also flow resistance, stain resistance and slide resistance, which are required generally as the printing form, are selected.

CONSTITUTION: An ink fixed layer is provided on at least one side of a transparent plastic film by drying a coating liquid consisting mainly of binder resin, inorganic spherical particles having mean particle diameter of 0.5-20 $\mu$ m and colloidal silica applied to one side of the transparent plastic film.

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## CLAIMS

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### [Claim(s)]

[Claim 1] The transparence print sheet characterized by having applied at least to one side of transparent plastic film the coating liquid which uses binder resin, an inorganic spherical particle with a mean particle diameter of 0.5-20 micrometers, and colloidal silica as a principal component, and preparing an ink fixing layer in it.

[Claim 2] The transparence print sheet according to claim 1 whose inorganic spherical particle is a silica.

[Claim 3] The transparence print sheet according to claim 1 whose inorganic spherical particle is a glass bead.

## DETAILED DESCRIPTION

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### [Detailed Description of the Invention]

#### [0001]

[Industrial Application] This invention relates to a transparence print sheet usable also as various packing materials by being able to print in the ink of usual drying oil as for example, various cards, labels, and a film for an overhead project, and using a recordable transparence print sheet and the film which can further be fabricated by various printers.

#### [0002]

[Description of the Prior Art] Although plastic film is generally excellent in transparency, workability, a mechanical strength, lightfastness, weatherability, and resistance to chemicals, when printing, the special ink suitable for each film must be used for it, or the printing method suitable for each film must be used for it, and it also has an unrecordable thing depending on a printer.

[0003] Since the sheet offset press occupies the mainstream as a printing machine for current and papers, if it can print with the sheet offset press, also in plastic film, it is convenient, but in plastic film, since desiccation hardening of ink is remarkable and slow, when the usual offset printing is performed and repeated, there is a problem that a set-off arises. Then, although there are some with which a porosity reforming layer is formed on the surface of a film, many plastic film which gave the absorptivity of ink is also proposed, and practical use is presented in order to make printing nature good, now, transparency will be spoiled.

[0004] Although there are various printings to which record means, such as printing, come to cover variably, for example, consider the aforementioned offset printing as the start, printing by the wire dot printer, printing by the thermal transfer printer, etc. in recent years, in the plastic film in which the reforming layer was formed on the surface of the above, it cannot respond to many record means and development of the plastic film which can be printed [ that it is transparent and ] is desired.

#### [0005]

[Problem(s) to be Solved by the Invention] This invention makes it the technical problem to offer the transparence print sheet which can be fabricated by being able to respond to the record means of varieties and choosing the transparence print sheet excellent in the damage resistance generally required of coincidence as a print sheet, resistance to contamination, slipping nature, etc., and a base material while being able to prevent the

set-off at the time of printing, without spoiling transparency by reforming the front face of transparent plastic film in view of the above conventional techniques.

[0006]

[Means for Solving the Problem] This invention was made for the purpose of solving the above-mentioned technical problem, and the configuration is characterized by having applied the coating liquid which uses binder resin, an inorganic spherical particle with a mean particle diameter of 0.5-20 micrometers, and colloidal silica as a principal component at least at one side of plastic film, and preparing an ink fixing layer.

[0007] Next, this invention is explained to a detail. If the plastic film as a base material is transparent, it is good, for example, it has polyolefine films, such as a polyethylene film and a polypropylene film, polyester film, a polycarbonate film, a triacetate film, a polyether ape phon film, a vinyl chloride film, the various acrylic films that make methyl methacrylate the start, or a cellophane film. Polyester film, a vinyl chloride film, and a polypropylene film are typical especially. Plastic film may use what raised adhesion with an ink fixing layer beforehand.

[0008] Moreover, shaping after printing is also attained by using the bright film of non-extended polyester film, a transparence vinyl chloride film, etc. which can be fabricated.

[0009] An ink fixing layer applies the coating liquid which mixed the inorganic spherical particle in resin, and is formed, and a silica and its glass bead are desirable as an inorganic spherical particle. When the thing of amorphism is used, with tales doses, the set-off prevention effectiveness runs short, and transparency also comes to be inferior to the case where a spherical thing is used with the scattered reflection of light.

[0010] If the mean particle diameter of an inorganic spherical particle has the desirable range of 0.5-20 micrometers and it is smaller than 0.5 micrometers, it will not demonstrate the set-off prevention effectiveness at the time of blocking prevention of films, and printing, and if larger than 20 micrometers, it will spoil the transparency of a film.

[0011] moreover, the addition of an inorganic spherical particle -- the binder resin solid content 100 weight section -- receiving -- 0.5 - 10 weight section -- it is 1 - 5 weight section preferably. If fewer than the 0.5 weight section, the set-off prevention effectiveness at the time of blocking prevention of films and printing cannot be demonstrated, but the transparency of a film will be spoiled if [ than 10 weight sections ] more.

[0012] As a means to control the set-off at the time of film printing, a means to absorb the solvent of ink early was taken most seriously conventionally. That is, the set nature of ink was improved by using the resin which absorbs the solvent of ink to the binder resin of an ink fixing layer conventionally, or is swollen with the solvent, and a means to prevent a set-off was taken.

[0013] However, it was made for this invention to lower the adhesion on the background of the film which laps with a printing ink front face upwards with the detailed irregularity of an inorganic spherical particle from the place where the result it should be satisfied also with \*\* et al. and such a means of the result enough is not obtained. That is, also where a film is accumulated considerably, in order for having used the inorganic spherical particle with it as the touch area with the film which laps upwards became small and the set-off was controlled by the detailed irregularity of an inorganic spherical particle to maintain this detailed irregularity, it is because it turned out that the inorganic

spherical particle is superior to an organic spherical particle from that hardness. Moreover, since it has a certain amount of oil absorption nature as the matter and an auxiliary role is played in acceptance of ink, and desiccation, a silica and a glass bead are desirable.

[0014] Another component which constitutes an ink fixing layer is binder resin. Although especially this binder resin is not limited, well-known acrylic resin, styrene resin, rubber system resin, vinyl chloride system resin, and vinyl acetate system resin are illustrated.

[0015] In order to prevent blocking resulting from the above-mentioned resin, it is effective if colloidal silica is added. the addition of this colloidal silica -- the binder resin solid content 100 weight section -- receiving -- 1 - 50 weight section -- it is 10 - 40 weight section preferably. If there are few additions than 1 weight section, the blocking prevention effectiveness will not be demonstrated, but if it increases more than 50 weight sections, transparency will be spoiled and a crack and milkiness will be produced at the time of shaping.

[0016]

[Function of the Invention] This invention is as above-mentioned. The transparence print sheet of this invention The above ink fixing layers are prepared in the front face, and a touch area with the film accumulated upwards with the detailed irregularity of an inorganic spherical particle is made small. Even if a film is accumulated while desiccation hardening by the oxidation polymerization of drying oil has been imperfect since adhesion energy is lowered If a set-off is not carried out and colloidal silica is added, blocking with a mold will not be caused in the state of the elevated temperature at the time of shaping as well as the usual blocking prevention.

[0017]

[Example] Next, the example of this invention is explained.

Example 1 Acrylic emulsion 100 Weight section (MOBINI-RU 727 Hoechst composition company make) Water 50 Weight section Colloidal silica 40 Weight section (Snow tex-40 Nissan Chemical Industries, Ltd. make) Silica microphone \*\*\*\*-.\*\* 2 (P-1500 catalyst formation industrial company make) The water paint which consists of the weight section on one side of transparent polyester film (100 micrometers in thickness) Applicator (1mil) It used and applied and dried for 5 minutes with the 100-degree C oven. The ink fixing layer of 5-micrometer thickness was formed in the obtained film. When RI circuit tester was used and printed to this thing and the set-off trial was performed, there was no set-off of ink. In addition, in the above-mentioned trial, \*\*\*\* set ink to 0.6 cc using usual ink. Moreover, after the set-off trial applied 600g/m ] 2 / sec load in piles and left transparent polyester film on the printing side immediately after printing overnight, it was performed by the approach of seeing the adhesion degree of the ink to said polyester film.

[0018] Example of a comparison Spreading desiccation only of the same acrylic emulsion as one example 1 was carried out by the same approach as a film plane, and the film with which the ink fixing layer of 3-micrometer thickness was formed was obtained. When the same set-off trial as the above was performed to this thing, the set-off of ink was looked at by the whole.

[0019] Example 2 Vinyl chloride vinyl acetate copolymer emulsion 100 Weight section (BINIBURAN 240 Nissin Chemical Industry Co., Ltd. make) Water 50 Weight section Colloidal silica 50 Weight section (Snow tex-20L Nissan Chemical Industries, Ltd. make) Silica microphone \*\*\*\*-.\*\* 3 (P-1500 catalyst formation industrial company

make) The water paint which consists of the weight section on one side of transparent non-extended polyester film (300 micrometers in thickness) It applied using the bar coating machine (0.2mm), and dried for 5 minutes with the 70-degree C oven. The ink fixing layer with a thickness of 5 micrometers was formed in the obtained film. When the same set-off trial as an example 1 was performed to this thing, the set-off was not seen at all.

[0020] Example of a comparison 2 Acrylic emulsion 50 Weight section (MOBINI-RU 9000 Hoechst composition company make) Acrylic emulsion 50 Weight section (MOBINI-RU 727 Hoechst composition company make) Water 50 Weight section Silica microphone \*\*\*\*-\*\* (P-1500 catalyst formation industrial company make) The bar coating machine (0.2mm) was used for one side of non-extended polyester film (300 micrometers in thickness), the water paint which consists of the 3 weight section was applied to it, and it dried for 5 minutes with the 70-degree C oven. The ink fixing layer with a thickness of 5 micrometers was formed in the obtained film. When the same set-off trial as an example 1 was performed to this thing, the set-off was not seen at all. Moreover, although, as for the thing of an example 2, blocking did not take place but the mold goods of high gloss were obtained when the reverse version printing was performed on the film of the above-mentioned example 2 and the example 2 of a comparison and having been fabricated using the vacuum forming machine, blocking produced the thing of the example 2 of a comparison a little.

[0021] Example 3 Acrylic emulsion 100 Weight section (MOBINI-RU DM774 Hoechst composition company make) Colloidal silica 30 Weight section (Snow tex-C Nissan Chemical Industries, Ltd. make) Water 50 Weight section Silica microphone \*\*\*\*-\*\* (P-1500 catalyst formation industrial company make) 5 The bar coating machine (0.2mm) was used and applied to one side of the polyester film (125 micrometers in thickness) with which the water paint which consists of the weight section was beforehand given to easily-adhesive processing, and it dried for 5 minutes with the 100-degree C dryer. The ink fixing layer with a thickness of 5 micrometers was formed in the obtained film. In this film, when the same set-off trial as an example 1 was performed, the set-off was not seen at all.

[0022] Example of a comparison 3 Acrylic emulsion 100 Weight section (MOBINI-RU DM774 Hoechst composition company make) Colloidal silica 30 Weight section (Snow tex-C Nissan Chemical Industries, Ltd. make) Water 50 Spreading desiccation of the water paint which consists of the weight section was carried out like the example 3, and the ink fixing layer with a thickness of 5 micrometers was formed in the obtained film. The set-off was looked at by the whole when the same set-off trial as an example 1 was performed to this thing.

[0023] Example 4 Acrylic-styrene emulsion 100 Weight section (MOBINI-RU 728 Hoechst composition company make) Colloidal silica 60 Weight section (Snow tex-C Nissan Chemical Industries, Ltd. make) Water 50 Weight section Glass bead 2 Weight section (Toshiba microphone \*\*\*\*-\*\* MB-10 Toshiba Ballotini Co., Ltd. make) since -- the bar coating machine (0.2mm) was used for one side of polyester film (100 micrometers in thickness), the water paint which changes was applied to it, and it dried for 5 minutes with the 100-degree C dryer. The ink fixing layer with a thickness of 5 micrometers was formed in the obtained film. When the same set-off trial as an example 1 was performed to this thing, the set-off was not seen at all.

[0024]

[Effect of the Invention] Since this invention is as above-mentioned, it can be used also as a transparence print sheet for a package by being able to print in the ink of usual drying oil as various cards, labels, and a film for an overhead project, and choosing what can be fabricated to a base material suitably as a recordable transparence print sheet by various printers.

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## (54) INK JET RECORDING SHEET

### (57)Abstract:

PROBLEM TO BE SOLVED: To adapt to high density full color by coating a transparent support with an ink receiving layer made in an uppermost layer of polyvinyl alcohol, colloidal silica and BR latex and added with organic fluorine surfactant.  
SOLUTION: A transparent support is coated with an ink receiving layer made in an uppermost layer of polyvinyl alcohol, colloidal silica and BR latex and added with organic fluorine surfactant to form an ink jet recording sheet adapted to a high density full color. The polyvinyl alcohol which contains a solid content of a range of 40 to 94 pts.wt. And has the degree of saponification of a range of 80 to 95mol% is suitable. The silica which contains a solid content of a range of 5 to 50% pts.wt. and having a particle size of a range of 40 to 200nm is suitable. The latex of 1 to 10 pts.wt. of alkali thickening type may be used.

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## CLAIMS

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[Claim(s)]

[Claim 1] The ink jet record sheet characterized by for the component of said ink absorbing layer maximum surface having consisted of poly vinyl alcohol, colloidal silica, and an SBR latex, and adding an organic fluorochemical surfactant in the ink jet record sheet which comes to carry out coating of the ink absorbing layer above further on a transparence base material.

[Claim 2] The ink jet record sheet according to claim 1 with which each of the above-mentioned component is characterized by having the range of poly vinyl alcohol 40 - 94 weight sections, colloidal silica 5 - 50 weight sections, and the SBR latex 1 - 10 weight sections as solid content weight.

[Claim 3] The ink jet record sheet according to claim 1 with which the above-mentioned poly vinyl alcohol is characterized by saponification degree [ of 80-95 mols ] being %.

[Claim 4] The ink jet record sheet according to claim 1 with which the particle diameter of the above-mentioned colloidal silica is characterized by being 40-200nm.

[Claim 5] The ink jet record sheet according to claim 1 with which addition solid content weight of the above-mentioned organic fluorochemical surfactant is characterized by being the 0.01 to 5 section to the solid content weight 100 section of a component (poly vinyl alcohol, colloidal silica, SBR latex) according to claim 2.

[Claim 6] The ink jet record sheet according to claim 1 characterized by for the above-mentioned organic fluorochemical surfactant having a hydrophilic radical as an amphiphile radical in the molecule, and not having a lipophilic group.

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## DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] the high density used about the record sheet which uses this invention for an ink jet recording method as a record sheet projected on a screen etc. by optical instruments, such as OHP (over head projector), in more detail -- it is related with the ink jet record sheet which was suitable in full color.

[0002]

[Description of the Prior Art] An ink jet recording method has little noise, and processes, such as development and fixing, are not needed and it is spreading quickly from the



ability of full color record to be performed easily in recent years. that a coloring image is formed especially by computer, that a recording device can be made comparatively small, and maintenance of the equipment -- easy -- in addition -- and it is used as a recording method of various printers by the advantage that generating of a drive sound and a record sound is very low.

[0003] Furthermore, it is attractive that the high density full color record sheet created with these ink jet printers can be used as a presentation tool by OHP (over head projector) etc. And when an ink jet recording method performs printing to such a record sheet, generally the following properties are required of a record sheet. Namely, the image with which that desiccation and a fixing rate are quick, there not being a monochrome mustache (feathering) and a color mixture mustache (bleeding) in (2) printing, and (3) printing of (1) monochrome and the color mixture part were carried out is clear. That transparency is high, excelling in that good conveyance nature is obtained and (4) (5) blocking resistance, excelling in the shelf life of the image by which (6) printing was carried out (there being no NIJIMI broth of ink), etc. are mentioned. In order to satisfy these properties, the various approaches of using water soluble resin and colloidal silica for an ink absorbing layer are proposed (JP,61-19389,A, JP,61-280983,A, JP,5-51469,A, etc.).

[0004] However, although conveyance nature and blocking resistance will have improved if conveyance nature and blocking resistance get worse and the ratio of colloidal silica was made to increase conversely, although desiccation and a fixing rate will have improved with the conventional technique if the ratio of water soluble resin was made to increase about the water soluble resin in an ink absorbing layer, and the ratio of colloidal silica, desiccation and a fixing rate got worse. Moreover, if the large particle diameter of the improvement effect of conveyance nature and blocking resistance uses colloidal silica 30nm or more, since it is little and conveyance nature and blocking resistance can be improved Although desiccation and a fixing rate are not reduced by not making the ratio of colloidal silica increase, particle diameter colloidal silica 30nm or more Since colloidal silica liquid itself became cloudy, it was difficult by reducing the transparency of an ink absorbing layer to use it to the record sheet for OHP with which transparency is demanded. Furthermore, when water soluble resin consisted only of poly vinyl alcohol, even if the image was clear immediately after printing, after preservation, the NIJIMI broth of ink might arise and image quality might deteriorate.

[0005]

[Problem(s) to be Solved by the Invention] As above-mentioned, by the conventional approach, conveyance nature and blocking resistance were reconciled with desiccation and a fixing rate, and transparency was high, the printed image was clear and there was a problem in obtaining the ink jet record sheet which is excellent in shelf life and which was suitable in full color with high density. This invention makes it a technical problem to offer the ink jet record sheet which is used as a record sheet which solves this problem and is projected on a screen etc. by optical instruments, such as OHP, and which was suitable in full color with high density.

[0006]

[Means for Solving the Problem] In order to solve this technical problem, in the ink jet record sheet which comes to carry out coating of the ink absorbing layer above further on a transparence base material, the component of said ink absorbing layer maximum

surface consists of poly vinyl alcohol, colloidal silica, and an SBR latex, and this invention is attained by having added the organic fluorochemical surfactant.

[0007] The film which consists of polyester, diacetate, an acrylic polymer, etc. can be mentioned that what is necessary is just the film which has permeability as a transparency base material used for this invention. The polyester film in these is desirable. Moreover, corona treatment, an under coat, etc. can also be performed in order to raise the bond strength of a base material and an ink absorbing layer.

[0008] The thickness of this transparency base material has desirable 25-300 micrometers, and its further 50-200 micrometers are more desirable. By less than 25 micrometers, the conveyance nature within the machine at the time of printing worsens [ the thickness of a transparency base material ], and if it exceeds 300 micrometers on the other hand, conveyance nature will worsen and will become disadvantageous also from the field of cost.

[0009] As for the poly vinyl alcohol used for the ink absorbing layer maximum surface prepared on a transparency base material by this invention, it is desirable to have the range of 40 - 94 weight section as solid content weight, and to have the 80-95-mol range of % as a saponification degree. If desiccation and a fixing rate separate from practical use level under in 40 weight sections and the solid content weight of poly vinyl alcohol exceeds 94 weight sections on the other hand, conveyance nature and blocking resistance will get worse. Moreover, if blocking resistance gets worse less than [ 80mol% ] and a saponification degree exceeds 95-mol% on the other hand, desiccation and a fixing rate, and transparency will get worse.

[0010] Moreover, the colloidal silica used for the ink absorbing layer maximum surface prepared on a transparency base material by this invention has 5 - 50 weight section range as solid content weight, and, as for particle diameter, it is desirable to have the range of 40-200nm. If solid content weight of colloidal silica cannot improve conveyance nature and blocking resistance under in 5 weight sections but exceeds 50 weight sections on the other hand, desiccation and a fixing rate, and transparency will get worse. Moreover, if the improvement effect of conveyance nature and blocking resistance falls in less than 40nm and particle diameter exceeds 200nm on the other hand, transparency will get worse also with the means of this invention.

[0011] Furthermore, the SBR latex used for the ink absorbing layer maximum surface prepared on a transparency base material by this invention has the range of 1 - 10 weight section. If solid content weight of an SBR latex cannot prevent the NIJIMI broth of the ink after preservation under in 1 weight section but exceeds 10 weight sections on the other hand, desiccation and a fixing rate will get worse. moreover, the improvement of coating nature to this invention sake -- an alkali thickening type or warming -- the SBR latex which denaturalized the gelation type can also be used.

[0012] An organic fluorochemical surfactant is added by the ink absorbing layer maximum surface prepared on a transparency base material by this invention adding. Aggravation of the transparency by colloidal silica addition can be prevented by addition of this organic fluorochemical surfactant. The organic fluorochemical surfactant added by this invention is the 0.01 to 5 section to the solid content weight 100 section of the above-mentioned component (poly vinyl alcohol, colloidal silica, SBR latex) by solid content weight, and is characterized by having a hydrophilic radical as an amphiphile radical in the molecule, and not having a lipophilic group. Addition number of copies of an organic

fluorochemical surfactant is not [ effectiveness ] discovered in the less than 0.01 sections, and if it exceeds the five sections on the other hand, a quality of printed character will deteriorate. Moreover, unless it has a hydrophilic radical as an amphiphile radical in the molecule, it cannot be used in a drainage system like this invention, but if it has a lipophilic group, transparency will get worse. furthermore, the inside of the printing nonuniformity and printer equipment which are generated when the dirt antisticking effectiveness can be given to an ink absorbing layer and it prints in the contact section with a paper presser-foot roller etc. by addition of an organic fluorochemical surfactant -- grind -- an advantage that a crack can be prevented is also acquired.

[0013] In addition, since it is discovered by giving the ink absorbing layer of this invention to an ink absorbing layer maximum surface, the effectiveness of this invention can also make the ink absorbing layer prepared on a transparence base material multilayer structure with a known ink absorbing layer.

[0014] Moreover, the ink absorbing layer and the known curl prevention layer of this invention can also be prepared in a support surface opposite to the field in which the ink absorbing layer of this invention was established for the curl prevention generated when relative humidity changes.

[0015]

[Embodiment of the Invention] Although the following examples and the example of a comparison explain this invention for this invention to a detail further, this invention is not limited to these examples. In addition, the numeric value in solid content conversion shall show all weight number of copies of an example and the example of a comparison.

[0016] As opposed to 10 weight sections of the 40-% of the weight liquid of the colloidal silica (the trade name Snow tex ZL, Nissan Chemical Industries, Ltd. make) whose particle diameter is 70-100nm (Example 1) the organic fluorochemical surfactant (trade name megger fuck F-142D --) which has a hydrophilic radical as an amphiphile radical in the molecule, and does not have a lipophilic group The 10-% of the weight liquid by the Dainippon Ink chemistry company After 0.3 weight section addition, The 48-% of the weight liquid of 85 weight sections and an SBR latex (trade name JSR-0696, Japan Synthetic Rubber Co., Ltd. make) for 8% of the weight of the water solution of the saponification degree % of the polyvinyl alcohol of 88 mols (a trade name PVA235, Kuraray Co., Ltd. make) 5 weight \*\*\*\*\*, Furthermore water was added, stirring mixing was fully carried out, and the coating liquid of liquid was obtained 8% of the weight. Coating of this coating liquid was carried out so that the thickness of the coating layer after desiccation might become 10 micrometers in a bar coating machine in the corona-discharge-treatment side of 100-micrometer transparence polyester film, and the sheet for record was obtained.

[0017] In 5 weight sections of 40-% of the weight liquid of the colloidal silica (the trade name Snow tex ZL, Nissan Chemical Industries, Ltd. make) whose particle diameter is 70-100nm, (Example 2) So much the organic fluorochemical surfactant (trade name megger fuck F-142D --) which has a hydrophilic radical as an amphiphile radical in the molecule, and does not have a lipophilic group The 10-% of the weight liquid by the Dainippon Ink chemistry company After 0.3 weight section addition, The 48-% of the weight liquid of 90 weight sections and an SBR latex (trade name JSR-0696, Japan Synthetic Rubber Co., Ltd. make) for 8% of the weight of the water solution of the saponification degree % of the polyvinyl alcohol of 88 mols (a trade name PVA235,

Kuraray Co., Ltd. make) 5 weight \*\*\*\*\* , Furthermore water was added, stirring mixing was fully carried out, and the coating liquid of liquid was obtained 8% of the weight. Coating of this coating liquid was carried out like the example 1, and the sheet for record was obtained.

[0018] In 50 weight sections of 40-% of the weight liquid of the colloidal silica (the trade name Snow tex ZL, Nissan Chemical Industries, Ltd. make) whose particle diameter is 70-100nm, (Example 3) So much the organic fluorochemical surfactant (trade name megger fuck F-142D --) which has a hydrophilic radical as an amphiphile radical in the molecule, and does not have a lipophilic group The 10-% of the weight liquid by the Dainippon Ink chemistry company After 0.3 weight section addition, The 48-% of the weight liquid of 45 weight sections and an SBR latex (trade name JSR-0696, Japan Synthetic Rubber Co., Ltd. make) for 8% of the weight of the water solution of the saponification degree % of the polyvinyl alcohol of 88 mols (a trade name PVA235, Kuraray Co., Ltd. make) 5 weight \*\*\*\*\* , Furthermore water was added, stirring mixing was fully carried out, and the coating liquid of liquid was obtained 8% of the weight. Coating of this coating liquid was carried out like the example 1, and the sheet for record was obtained.

[0019] (Example 4) The sheet for record was obtained like the example 1 except having changed the colloidal silica of an example 1 into the 40-% of the weight liquid of the colloidal silica (the trade name Snow tex XL, Nissan Chemical Industries, Ltd. make) whose particle diameter is 40-60nm.

[0020] (Example 5) The sheet for record was obtained like the example 1 except having changed the colloidal silica of an example 1 into the 40-% of the weight liquid of the colloidal silica (the trade name Snow tex MP 2040, Nissan Chemical Industries, Ltd. make) whose particle diameter is 200nm.

[0021] In 10 weight sections of 40-% of the weight liquid of the colloidal silica (the trade name Snow tex ZL, Nissan Chemical Industries, Ltd. make) whose particle diameter is 70-100nm, (Example 6) So much the organic fluorochemical surfactant (trade name megger fuck F-142D --) which has a hydrophilic radical as an amphiphile radical in the molecule, and does not have a lipophilic group The 10-% of the weight liquid by the Dainippon Ink chemistry company After 0.3 weight section addition, The 48-% of the weight liquid of 89 weight sections and an SBR latex (trade name JSR-0696, Japan Synthetic Rubber Co., Ltd. make) for 8% of the weight of the water solution of the saponification degree % of the polyvinyl alcohol of 88 mols (a trade name PVA235, Kuraray Co., Ltd. make) 1 weight \*\*\*\*\* , Furthermore water was added, stirring mixing was fully carried out, and the coating liquid of liquid was obtained 8% of the weight. Coating of this coating liquid was carried out like the example 1, and the sheet for record was obtained.

[0022] In 10 weight sections of 40-% of the weight liquid of the colloidal silica (the trade name Snow tex ZL, Nissan Chemical Industries, Ltd. make) whose particle diameter is 70-100nm, (Example 7) So much the organic fluorochemical surfactant (trade name megger fuck F-142D --) which has a hydrophilic radical as an amphiphile radical in the molecule, and does not have a lipophilic group The 10-% of the weight liquid by the Dainippon Ink chemistry company After 0.3 weight section addition, The 48-% of the weight liquid of 80 weight sections and an SBR latex (trade name JSR-0696, Japan Synthetic Rubber Co., Ltd. make) for 8% of the weight of the water solution of the

saponification degree % of the polyvinyl alcohol of 88 mols (a trade name PVA235, Kuraray Co., Ltd. make) 10 weight \*\*\*\*\*, Furthermore water was added, stirring mixing was fully carried out, and the coating liquid of liquid was obtained 8% of the weight. Coating of this coating liquid was carried out like the example 1, and the sheet for record was obtained.

[0023] (Example 8) The sheet for record was obtained like the example 1 except having changed the addition of 10-% of the weight liquid of the organic fluorochemical surfactant (trade name megger fuck F-142D, the Dainippon Ink chemistry company make) of an example 1 into the 0.1 weight section.

[0024] (Example 9) The sheet for record was obtained like the example 1 except having changed the addition of 10-% of the weight liquid of the organic fluorochemical surfactant (trade name megger fuck F-142D, the Dainippon Ink chemistry company make) of an example 1 into 5 weight sections.

[0025] (Example 1 of a comparison) The sheet for record was obtained like the example 1 except having changed the polyvinyl alcohol of an example 1 into saponification degree % of the polyvinyl alcohol of 71 mols (trade name PVA L-8, Kuraray Co., Ltd. make).

[0026] (Example 2 of a comparison) The sheet for record was obtained like the example 1 except having changed the polyvinyl alcohol of an example 1 into saponification degree % of the polyvinyl alcohol of 99 mols (trade name PVA135H, Kuraray Co., Ltd. make).

[0027] The \*\* which does not use colloidal silica (the trade name Snow tex ZL, Nissan Chemical Industries, Ltd. make), (Example 3 of a comparison) In 8% of the weight of the water-solution 95 weight section of the saponification degree % of the polyvinyl alcohol of 88 mols (a trade name PVA235, Kuraray Co., Ltd. make) the organic fluorochemical surfactant (trade name megger fuck F-142D --) which has a hydrophilic radical as an amphiphile radical in the molecule, and does not have a lipophilic group the 10-% of the weight liquid by the Dainippon Ink chemistry company -- the 48-% of the weight liquid of after 0.3 weight section addition and an SBR latex (trade name JSR-0696, Japan Synthetic Rubber Co., Ltd. make) -- 5 weight \*\*\*\*\* -- further -- water -- in addition, stirring mixing was fully carried out and the coating liquid of liquid was obtained 8% of the weight. Coating of this coating liquid was carried out like the example 1, and the sheet for record was obtained.

[0028] In 60 weight sections of 40-% of the weight liquid of the colloidal silica (the trade name Snow tex ZL, Nissan Chemical Industries, Ltd. make) whose particle diameter is 70-100nm, (Example 4 of a comparison) So much the organic fluorochemical surfactant (trade name megger fuck F-142D --) which has a hydrophilic radical as an amphiphile radical in the molecule, and does not have a lipophilic group The 10-% of the weight liquid by the Dainippon Ink chemistry company After 0.3 weight section addition, The 48-% of the weight liquid of 35 weight sections and an SBR latex (trade name JSR-0696, Japan Synthetic Rubber Co., Ltd. make) for 8% of the weight of the water solution of the saponification degree % of the polyvinyl alcohol of 88 mols (a trade name PVA235, Kuraray Co., Ltd. make) 5 weight \*\*\*\*\*, Furthermore water was added, stirring mixing was fully carried out, and the coating liquid of liquid was obtained 8% of the weight. Coating of this coating liquid was carried out like the example 1, and the sheet for record was obtained.

[0029] (Example 5 of a comparison) The sheet for record was obtained like the example 1 except having changed the colloidal silica of an example 1 into the 20-% of the weight

liquid of the colloidal silica (the trade name Snow tex C, Nissan Chemical Industries, Ltd. make) whose particle diameter is 10-20nm.

[0030] (Example 6 of a comparison) The sheet for record was obtained like the example 1 except having changed the colloidal silica of an example 1 into the 30-% of the weight liquid of the colloidal silica (trade name Snow tex MP-3030, Nissan Chemical Industries, Ltd. make) whose particle diameter is 300nm.

[0031] In 10 weight sections of 40-% of the weight liquid of the colloidal silica (the trade name Snow tex ZL, Nissan Chemical Industries, Ltd. make) whose particle diameter is 70-100nm, (Example 7 of a comparison) So much the organic fluorochemical surfactant (trade name megger fuck F-142D --) which has a hydrophilic radical as an amphiphile radical in the molecule, and does not have a lipophilic group the 10-% of the weight liquid by the Dainippon Ink chemistry company -- 8% of the weight of the water solution of after 0.3 weight section addition, and the saponification degree % of the polyvinyl alcohol of 88 mols (a trade name PVA235, Kuraray Co., Ltd. make) -- 90 weight \*\*\*\*\* -- further -- water -- in addition, stirring mixing was fully carried out and the coating liquid of liquid was obtained 8% of the weight. Coating of this coating liquid was carried out like the example 1, and the sheet for record was obtained.

[0032] In 10 weight sections of 40-% of the weight liquid of the colloidal silica (the trade name Snow tex ZL, Nissan Chemical Industries, Ltd. make) whose particle diameter is 70-100nm, (Example 8 of a comparison) So much the organic fluorochemical surfactant (trade name megger fuck F-142D --) which has a hydrophilic radical as an amphiphile radical in the molecule, and does not have a lipophilic group The 10-% of the weight liquid by the Dainippon Ink chemistry company After 0.3 weight section addition, The 48-% of the weight liquid of 75 weight sections and an SBR latex (trade name JSR-0696, Japan Synthetic Rubber Co., Ltd. make) for 8% of the weight of the water solution of the saponification degree % of the polyvinyl alcohol of 88 mols (a trade name PVA235, Kuraray Co., Ltd. make) 15 weight \*\*\*\*\*, Furthermore water was added, stirring mixing was fully carried out, and the coating liquid of liquid was obtained 8% of the weight. Coating of this coating liquid was carried out like the example 1, and the sheet for record was obtained.

[0033] (Example 9 of a comparison) The sheet for record was obtained like the example 1 except not adding the organic fluorochemical surfactant (trade name megger fuck F-142D, the Dainippon Ink chemistry company make) of an example 1.

[0034] (Example 10 of a comparison) The sheet for record was obtained like the example 1 except having changed the addition of 10-% of the weight liquid of the organic fluorochemical surfactant (trade name megger fuck F-142D, the Dainippon Ink chemistry company make) of an example 1 into 10 weight sections.

[0035] (Example 11 of a comparison) The sheet for record was obtained like the example 1 except having changed into the 10-% of the weight liquid of the organic fluorochemical surfactant (the trade name megger fuck F-177, the Dainippon Ink chemistry company make) which has a hydrophilic radical for the organic fluorochemical surfactant of an example 1 as an amphiphile radical in the molecule, and has a lipophilic group further.

[0036] The recording apparatus (the Seiko Epson make, ink jet printer MJ-700V2C) equipped with the on-demand mold ink jet recording head which makes ink breathe out with a piezo trembler, and automatic feeding equipment was used to the sheet for record of the example of the above-mentioned publication, and the example of a comparison,

and ink jet record was performed.

[0037] The evaluation result of the sheet for record of the example which performed ink jet record, and the example of a comparison is shown in Table 1 and 2. In addition, each evaluation was judged as follows. Here, the evaluation x level is the level in which real use is impossible, O level is desirable marginal level and O level is more desirable level.

[0038] (Drying) After ink jet record, the time amount which does not become dirty even if it touches the printing section with a finger was measured and judged.

O level: -- less than 15 seconds and O level: -- less than 60 seconds, even if x level:60 seconds or more pass, become dirty.

[0039] (Fixable) After leaving it for 10 minutes after ink jet record, the PPC form was piled up, and it judged with extent which the printing section imprinted on paper.

O Level : the x level:monochrome section which does not produce an imprint and which produces an imprint slightly only in an O level:pale printing part also produces an imprint.

[0040] (Feather ring) The alphabetic character of black was printed on the yellow of an ink jet record image, and it judged with irregular extent which was produced to the alphabetic character and bleeding (feather ring).

O Level : the x level:feather ring which does not produce a feather ring and which an O level:feather ring produces slightly arises remarkably.

[0041] (Boundary blot) It judged with extent of the blot produced on the boundary where Green's full solid one touches the red of an ink jet record image.

O Level : the x level:blot which the O level:blot which does not produce a blot produces slightly arises remarkably.

[0042] (Printing nonuniformity) It judged with extent of the nonuniformity of the ink produced into the solid part of an ink jet record image.

O Level : the nonuniformity of x level:ink which does not produce the nonuniformity of ink and which the nonuniformity of O level:ink produces slightly arises remarkably.

[0043] (Hayes) The difference of Hayes (B) of the non-printed part after Hayes (A) and coating of the base material in front of coating was computed by the degree type, and, as a result, it judged with the value of (C).

Hayes of the base material in front of the (Hayes B)-coating of the non-printed part after the (Hayes C) = coating (A)

In addition, measurement of Hayes is JIS. K It measured according to 7105.

O Level : less than 5%, less than [ O level:10% ], and more than x level:10%

[0044] (Conveyance nature) Automatic feeding equipment was used, the continuation \*\*\*\* trial of 50 sheets was performed under 27 degrees C and the environment of 65% of humidity, and it judged according to the situation.

O Level : produce a poor feed in x level:automatic feeding which does not cause a poor feed by automatic feeding.

[0045] (Blocking resistance) Superposition, where a 500g load is applied for one month, after leaving the sheet for record of two sheets under 40 degrees C and the environment of 80% of humidity, it judged according to the adhesion condition of the sheet for record of two sheets.

O Level : the x level:adhesion which the O level:adhesion which does not produce adhesion produces slightly arises remarkably.

[0046] (Image shelf life) After leaving an ink jet record image for three days under 32

degrees C and the environment of 85% of humidity, it judged with extent of the NIJIMI broth from the ink which forms an ink jet record image.

O Level : the x level:NIJIMI broth which does not produce a NIJIMI broth and which an O level:NIJIMI broth produces slightly arises remarkably.

[0047] (The remains of a printing section roller) the inside of the printing nonuniformity and printer equipment which are generated when printing in the contact section with the paper presser-foot roller produced in the ink jet record image created by feeding which uses automatic feeding equipment, and the on-demand mold ink jet recording head -- grind -- it judged with extent of the printing nonuniformity by the crack.

O Level : the x level:printing nonuniformity which does not produce printing nonuniformity and which O level:printing nonuniformity produces slightly arises remarkably.

[0048]

[Table 1]





[Table 2]

[0050]

[Effect of the Invention] the high density which conveyance nature and blocking resistance are reconciled with desiccation and a fixing rate, and transparency is high, is clear, and is excellent in shelf life with the ink-jet record sheet of this invention as explained in full detail above -- the high density which can obtain the ink JIETO record sheet which was suitable in full color, and is used as a record sheet projected on a screen etc. by optical instruments, such as OHP, -- the technical problem that the ink JIETO record sheet which was suitable in full color is offered solves. [ of the printed image ]